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ABSTRACT

This document provides a reason for applying known cost-accounting methodology within the realm of higher education and attempts to make the known techniques viable for sets of objectives within the university environment. The plan developed here is applied to a department, the lowest level in the university hierarchy, and demonstrates costs in every field necessary for the university resource-requirement (budgetary) process. (Author/MJM)

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COSTING PRINCIPLES IN HIGHER EDUCATION AND THEIR APPLICATION

Preliminary Draft

by
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COSTING PRINCIPLES IN HIGHER EDUCATION AND THEIR APPLICATION

Purpose

The purpose of this chapter is to search into avenues which provide a raison d'etre for applying known cost accounting methodology within the realm of Higher Education, and, more importantly, to make a serious effort to explore specific alternatives to make the known techniques viable for sets of objectives within University environment. Special emphasis is given to the public sector institutions.

This task has been made easier by the remarkable work done within the National Center for Higher Education Management Systems (NCHEMS) at WICHE. Their Preliminary Field Review Edition on Cost Finding Principles and Procedures, Technical Report 26, set forth an approach to which critiques have been invited. We hope we can provide not only such a critique but can make positive contributions.

INTRODUCTION

"Searching cost-accounting procedures should be inaugurated so that any knowledgeable person could easily learn for what specific activities the institution's funds are being spent, and particularly whether various items of expenditure can be justified on the basis of the declared institutional purposes".[1]

The above truism has all the aspects of a trap in which any institutional administrator could be caught. Cost-accounting per se is a technique perfected during the last 70 years within the profit-oriented industrial sector where it has reached a considerable degree of sophistication. Together with established financial-accounting techniques, it has become the single most important tool for corporate decision making.

Within the industrial domain, cost accounting techniques have been adjusted and refined through a variety of applications designed to meet the particularities of different corporate and industrial entities. During the past thirty years, the applicability of cost accounting techniques have been tested in environments other than industry, e.g., merchandising, insurance, banking

and, more recently, in governments, non-profit organizations, and institutions. The latter development was accelerated as a result of conclusions reached by the Hoover Commission and their subsequent recommendations which included the quest for cost based budgeting.[2]

The strongest impulse for cost accounting methods within governments and institutions resulted from the evolution of systems for Planning, Programming, and Budgeting most resolutely introduced during the early sixties in the Department of Defense by Robert S. McNamara. Those "systems", the historic roots of which go back to applications used by industry in the twenties, were conceptualized in 1936 by Wylie Kilpatrick[3], a professor of the University of Florida. In this early remarkable conceptualization one finds reference to cost accounting techniques with cautions noted which one must exercise when bringing a developed technique from one environment to another through methods of classification. Kilpatrick speaks of "service activity" explaining that "classification must be built upon the unit of the service activity standing for the conduct involved in the process of a specific service. That is, each service is defined by the boundaries of the process for administering the activity."[4] But then turning to the application of cost accounting he warns: "Service measures do not necessarily refer to unit cost measures and cost accounting has only a partial and specific utility that does not apply to all measures. Different categories of service measure emerge. *The element of cost indeed is wholly divorced from the second general category for classifying the measuring expenditure. . .the functional service is measured not in terms of cost or money expended, but in terms of the amount of material used, the number of men employed and especially the number and kinds of services performed.*"[5]

The application of cost accounting techniques within the structures of higher education has also been cautioned by institutional researchers. Cavanaugh very recently stated: "on the one hand it gives the mistaken impression to academic administrators that,within its proper context, unit-cost date has a validity in higher education comparable to that of analytical cost data in business and industry. This is simply not so. The comparison is at best an analogous one; the very best unit-cost information in education does not even approach the significance and usefulness of cost data in profit seeking organizations. It does not provide a firm basis from which to control expenditures, nor can it be used to put a value on the 'product'. Even in proper context it is the wrong term: 'unit-expenditure' is far more accurate. The terminology also is repellent to many academicians, and hardly flattering to the best instruction and research to be found in the universities and colleges. Because of this, it is ignored by many influential individuals within the

adacemic decision-making structure. This is quite unfortunate because, with all its shortcomings, unit-cost information is an important and probably essential adjunct to informed decision-making."[6]

Both Earl McGrath's "survival option" and Cavanaugh's somewhat obscure caution have not groped with the problem of purpose-directed adaptation. John Dale Russell and James I. Doi found it curious that despite the vehemence of the criticism, "wise and prudent administrators continued to find advantages in the use of unit cost data."[7]

In spite of the vehemence of published criticism associated with cost analysis procedures in Higher Education, there is one realism which can neither be criticized nor altered: the formulae used by a great number of agencies controlling the resources of Higher Education in the United States and Canada are "cost-based"![8]

I. APPLICATION OF COST ACCOUNTING PRINCIPLES TO HIGHER EDUCATION

Horngreen observes: "In general, cost means sacrifice or foregoing, but there is no unique 'correct' classification of cost that is applicable to all situations, that is pertinent for all purposes."[9]

Cost accounting definitions tend to cluster around two distinct views stated in the Accountants Cost Handbook:[10]

1. The narrow view of cost accounting restricts the field to the determination of the historical cost of manufacturing in terms of department, cost centers, and products. These costs may or may not be compared with standard costs for control purposes. According to this view, budgeting, distribution cost analysis, and similar functions are distinct from cost accounting.
2. The broad view of accounting places on the field the responsibility for advising management on both historical and future costs in such a manner as to contribute directly to managerial planning and control of organization and operations. According to this view, distribution cost analysis does not differ from manufacturing cost determination. Both are required to advise management on the nature of operations. Budgeting, under the broad view, is only one aspect of the function of providing management with information on future costs.

(A) Cost Finding Concepts

Based upon Horngreen's classification of cost in accordance with the situation served, it is easily seen that cost accounting evolved around the necessity of identifying the amount of resources sacrificed in producing and readying goods to be sold on the market place and that the methods of such identification are dictated by the particular situation. To be more explicit, the flow of cost and, therefore, the methodology of costing depends on the particularities of the three parts inherent in any production process:

In an industrial environment, inputs, processes and outputs are predefined. This predefinition differ between such industries as mining, fabrication, and distribution, and within fields of these industries, e.g., goldmining versus oilwells and textile fabrication versus automobile production.

What makes a common denominator is the basic principle of accounting which demands a balancing of inputs and outputs.

INPUT COST = COST OF SALES

There is complete absorption of *all* "costs"[11] in the product leaving the production line.

Since cost has here been defined as sacrificed resources, the product will not only absorb current expenditures, e.g. labor and materials, but will also absorb a portion of the resource expenditures which are depleted over a long term production period. The most obvious example of the latter is the depreciation of capital assets used in production which lose value in the process.

Implicit in the above is that costing of all input resources has meaning only if the output or product is sold on the market place to replenish the resources used in the production process.

The principles of budgeting applied in the private enterprise production sector bases revenues on the recovery of cost plus a profit. Application of those principles in the governmental or institutional sector, as later to be explored, must begin with that consideration. It should already be obvious that revenues in the governmental or institutional environment are not generated to replenish the resources and/or to produce a profit!

(B) Cost Analysis

In the early stages of cost accounting methodology development, the methods applicable to "cost-finding" of the input-output resource absorption relationship were recognized as analytic tools for controlling and managing the production process. The resource input is channelled through the technological processes necessary to ready the output. These resource inputs may be:

1. Either material or labor, or service, or absorption of the applicable portion of capital asset depletion;
2. identifiable with the product or part of the product to be produced;
3. identifiable with a single process or processes which are sequential or otherwise intertwined to become the product, or
4. not directly identifiable with such products or processes.

In the latter case, relationships are empirically assumed and costs added in accordance with the assumptions.

Whatever the engineering or technical complexity of a process, cost accounting follows the product flow; if in a certain process wool is spun, the spinning process becomes a cost center and the carded wool entering the process enters with the cost determined in the preceeding carding process. Costs are added for each operation performed in the spinning process, accounting for the labor costs of the operations, costs of added material as well as for the cost of machine usage and any other cost directly or indirectly applicable.

As the cost of specified materials and/or labor of different operations which are moving through the various channels of manufacturing operations are identified and costs not directly applicable are specified, the paramount questions present themselves: (1) whether our operation has been efficiently executed, (2) whether the most applicable materials at the most reasonable price have been selected; and (3) whether all assets available have been most optimally utilized? In other words, has the process utilized resources in the most economic way?

These questions transform cost accounting into managerial accounting. The methods to be applied must highlight the economic possibilities to be achieved in input and process without detering the quality or quantity of outputs. To historically follow the costs of resources from input through operations to the output is not sufficient for adequate management. It should be noted that even the most accurately quantified depletion of resources would not provide

sufficient information to decide the question of the most economic use of those resources. The various activities (operations) at each stage of the process must be analyzed. The behavioral pattern of each individual operation may have a different impact on the economy of the totality of the process. In one case a speeding up of the operation may have a greater economic impact, but in respect to another operation may have the opposite result. Only careful and systematic analysis will reveal true interrelationships.

The methods generally used to determine the economy of input and process are those of predetermined cost; i.e., predetermining cost of individual operations within the process as well as predetermining costs of individual materials entering the process and relating this to all factors of utilization. Predetermined cost of units entering a process – both of labor and material – are subject to quantity, quality, and price variables. Usage of quantities and the selection of price is dependent upon a number of control factors; what is controllable, less controllable or uncontrollable remains complex. The decisions about what inputs should be used and how the process should be organized are dependent upon the circumstances existing in the environment at that particular time.

Predetermination can follow a simple estimation process often motivated by the rule of thumb, or if properly developed, by the setting of standards which vary in their degree of sophistication. Generally, cost *standards* developed by scientific methods are predetermined costs of products, product components, processes, operations, services, activities, and projects and are used as the statistical bases for determining variances used to analyze efficiency, effectiveness, performance and utilization. For the inputs of labor, material or overhead, standard costs are used to measure the efficiency, effectiveness and utilization against the actual costs. The utilization factors affecting cost must be measured in relation to a "capacity" which requires agreement with assumptions of "normal capacity", "optimal capacity" and "maximal capacity".

Standards are only as good as the criteria or the incidental condition under which such standards are set. The types of standards are also important: (1) "ideal – concerned with the most favorable condition and thus rarely to be changed; (2) "basic" – tailored to conditions upon which later changes are made; (3) "normal" – fitted to a situation to prevail over a long period; (4) "current" – applicable to a set period and replaced during an ensueing period when price or other changes occur.

As a measure, standards provide management with quantitative means to compare actual costs with expectations and provide the capability for analyses of the variances either for

justification of decisions taken or examination of possible alternative actions. Historic cost accounting methods reveal matters only after the fact – the use of standards allows viewing of managerial practices during all stages of the input to output process. Relating to inputs, the methods can immediately reveal either price increases of labor and materials which are difficult to control or imprudent use of higher priced personnel or material. Within a process inefficient labor methods are revealed for each operation or activity and waste of material can become evident. Within the processes under-utilization of facilities and equipment are highlighted. The magnitude of actual costs of output as compared with the predetermined costs reveal at that time whether or not management must look through further analysis for justification of variances.

In the production of human capital with which higher education is involved, the introduction of cost analysis must be carefully pondered. If within the private sector, the application of costing techniques were modified to fit the varieties of corporate units, ipso facto circumstances within the institutional environment will dictate the use of different or modified methods. The difference of *purpose of analysis* in the "private profit sector",[12] the "private non-private sector", and the "public sector" must be obvious! Resource-replenishment through cost-recovery is imperative in the first two sectors while accountability for costs might be the only requirement in the public sector. Analysis of efficiency, effectiveness, and utilization will, therefore, be emphasized differently within the institutions belonging to each sector (private versus public universities). Methods may also be modified as certain criteria apply to other differential systems of classification. Within the institution itself analytical costing methods may differ when applied to the various purposes of the organizational units which the university or multiveristy encompasses - the variety of fields, the different levels, etc. within the "support-functions" which are often introduced on principles of "cost-reimbursement", analytical methods should conform with those applied in commerce.

The above observations will be kept in mind as we later develop sets of standards for analysis within the university environment.

(C) Resource – Requirement Costing

Governmental or institutional accounting is basically oriented toward and essential to the formulation of budgets. Governments and Institutions fully or partially financed by governments are under very different financial constraints than their counterparts in the private profit-seeking sector. While in the private sector the replenishment of expenditures is achieved by selling the

product, as stressed earlier, public sector monies for expenditures are provided by repeated imposition upon the taxpayer for every succeeding fiscal period.

While one must agree with economists that educational processes produce human capital and thus the resource input within a nation is somewhere amply recovered by economic growth of the nation, there are no ways of directing accounting procedures to cost recovery within national product growth to the individual taxpayer who has to provide the input resources.

Burkhead has characterized this relationship most clearly when he stated: "organizational forms for the conduct of economic activity shade off, one into the other. Sharp lines do not always divide that which is household activity from that which is business firm activity, nor divide that which is governmental from that which is nongovernmental. Some of the most difficult questions of public policy, of administration, and of budgeting come from these borderline areas, where the shadings are almost imperceptible."[13]

Kerrigan stated as the financial objectives of governments and institutions "to obtain annual revenues from authorized (or appropriate) sources in amounts sufficient to cover necessary expenditures" and listed some of the more interesting consequences:

> There is no provision of funds to meet future replacement of buildings and equipment. While capital is employed, it is not an objective to maintain it fully from current revenues. Maintenance of capital, in other words, is not a consideration, so far as general revenues are involved. Expenditures are not related to revenues in the same way; i.e., they are not matched against revenues as a cost of earning such revenues. Furthermore, expenditures include "capital" expenditures for physical facilities, as well as operating expenditures. Depreciation is not usually regarded as a cost, doubtless because it is not considered as a recoverable cost. To put the matter in another way, the *flow* of assets through an *expendable fund* is the focus of attention, not profit from operations. This stands in sharp contrast to conduct of a business enterprise in which the use of an expendable fund is of no significance.[14]

Accepting "the flow of asset" theory, the categorization of types of expenditures as Kilpatrick[15] has indicated becomes paramount. Obviously such categorization must be constrained so that it brings out clearly those groups of expenditures which are homogeneous not only as an input, but also in the defined groups of activities and remain recognizable in the output.

The traditional budget process which expressed the paramount economic concepts of allocations, distribution, and stabilization[16] somewhat blurred administrative needs which are not, of necessity, at odds with those concepts. While the economist is quite satisfied with a basic line item categorization, the analysis of the process must be sufficiently convincing that line items have to be translated within the organizational hierarchy by methods of crosswalks.

Translation of input cost through the process to the output must be clear and meaningful to the administrator who has to justify resource-requirements within the budgetary process. But one is well advised to realize that "administrator" does not necessarily mean "top administrator". Classification – clarity is just as important for the lowest level line administrator as it is for the "field-administrator" (horizontal organization) and the top administrator!

The methodologies used in integrating planning, programming, budgeting can be very helpful in delineating the Resource Requirement flow.

If in a University we accept a program structure culminating in three major program categories",

Student Related,

Environmental Related,

Internally Directed,

we have so created the means of following resource requirements by very different methods.

Within the first category we can follow the organizational structure by translating line items required in the lowest unit (mostly direct cost of a department) to the cost of activities in the process (mostly courses, lab-sessions, seminars, etc.) to the cost of programs within that category (BA in Geology, MA in Accounting, Ph.D. in Economics). Since line item apportionment within a department is traditional in most budgeting units, no problems should arise.

In attempting to identify activities, it becomes obvious that there are not only activities which lead to student related programs but all program categories might be tangent to individual or groups of activities. Identification might be attempted through reasonable measuring techniques. In some cases arbitrary decisions are the only means for apportionment or allocation.

Resource Requirement Costing on the Departmental Level

The schematic shown on the following page (*Exhibit 1*) illustrates a micro-universe of resource requirement costing within a university; micro-universe because it is applied to a "Department", the lowest level in the University hierarchy, and because it demonstrates costs in every field necessary for the University Resource-Requirement (budgetary) process. The illustration demonstrates the cross-over from:

(1) Funds Available To
- (2) Things we must buy (line items)
- (3) Functions we are serving
- (4) Activities we are involved with
- (5) Program outputs we are producing (contributions of department)

UNIVERSITY OF GEORGIA

BUDGET AND ACCOUNTING DOCUMENT

Fiscal Year 197 3

SCHOOL: DEPARTMENT OR INSTITUTE:

(1) FUNDS GENERATED	$ PREVIOUS	$ CURRENT	$ PROPOSED
Ga. Approp. (Formula Net)	268,411		
Stud. Fees & Other Income	72,058		
TOTAL FORMULA	340,469		
Federal Grants	20,000		
Other Grants	33,000		
TOTAL	393,469		
FUNDS REC'D or EXPECTED	390,000		

EFT	(2) LINE ITEMS	$ PREVIOUS	$ CURRENT	$ PROPOSED
1.0	Department Head	25,000		
1.5	Full Professor	35,000		
3.0	Associate Professor	60,000		
6.5	Assistant Professor	108,000		
3.0	Instructors	27,000		
6.0	Graduate Assistants	55,000		
	Others			
20.5	Total Academic & Instructor	310,000		
.5	Counselor	8,000		
4.0	Clerical	22,000		
25.0	TOTAL PERSONNEL	340,000		
	Supplies	10,000		
	Travel	30,000		
	Department Equipment	10,000		
	TOTAL ALLOTMENT	390,000		

EFT	(3) FUNCTIONAL DISTR.	$ PREVIOUS	$ CURRENT	$ PROPOSED
1.5	Instrus. Administr	97,000		
15.0	Instruction	222,254		
0.5	Academic Counsl.	8,000		
3.0	General Research	3,500		
2.5	Sponsored Research	33,574		
2.5	Service	25,672		
25.0	TOTAL	390,000		

(4) ACTIVITY DISTRIBUTION (Previous Year)

A. Instruction

LEVEL	No. of COURSES/ SECTIONS	No. STUDENTS	SCH	TCH	DOLLARS
LL	3/32	874	4370	160	46,940
UL	7/38	584	2920	190	85,779
PROF	-	-	-	-	-
GRAD	9/58	430	2038	274	173,381
Totals	19/128	1888	9328	624	306,100

B. General Research Activities	-
C. Sponsored Research Activities	48,300
D. Service Activities	35,600
E. Others	
TOTAL ACTIVITIES	390,000

(5) PROGRAM CONTRIBUTION (Previous Year)

Level	Program Package	SCH	DOLLARS	$ BY LEVELS
LL	Humanities	1100	35,447	
	Major Dir	1070	11,491	46,940
UL	Major 1	310	9,107	
	Major 2	1130	33,195	
	Major 3	670	19,682	
	Major 4	790	23,207	
	General	20	588	85,779
GR	Master X	912	77,588	
	Master Y	741	63,040	
	Ph.D. X	211	17,951	
	Ph.D. Y	125	10,634	
	Ph.D. Z	49	4,168	173,381
	Instructional Programs	9328		306,100
RESEARCH	Project NY2		22,500	
	Project UGA 506		12,000	
	Project A 141		12,400	
	Project NSF 506		1,400	48,300
SERVICE	Georgia INST		18,500	
	Project S 506		12,400	
	Project S 507		4,700	35,600
	Total Program Contribution			390,000

FORD FOUNDATION

PPHS FORM 5
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While the illustrative model cannot be identified with a live department, the model has been developed as realistically as possible and can be documented from back up data.

Following procedures existing within the Budgeting System of the University of Georgia, twenty-five EFT were distributed to six functions: instructional administration, instruction, academic counseling, general research, sponsored research, and service as shown in the illustration. A distribution of this kind is arbitrary! It presupposes that the department head *has full knowledge of all weighting factors* which are as accurate as possible. The effort spent by a faculty member in one case could be the best method of distribution, but in another instance might be completely unacceptable. The price determination need not have a relationship with the effort but the EFT distribution in all cases must be based upon some type of benchmark, in this case the Teacher Contact Hours (TCH). While at the University of Georgia, the Board of Regents prescribes 15 TCH as a standard, the actual teaching load will range from an average of 4.6 to 14.8 TCH.[17] In the model, we accepted a 15 TCH load as a standard and used that standard for the setting of a benchmark.

Any pricing decisions should be tied into benchmarks. The idea of a benchmark is quite simple and can be illustrated as follows:

Professor Jones, hired on a twelve-month contract for his research capabilities at an annual salary of $20,000, has agreed to a teaching workload of 5 TCH per quarter. His department relates this to the standard of 15 hours per quarter or 60 hours per year which becomes the benchmark for TCH distribution. Since Professor Jones has been primarily hired for his research capabilities but has been asked to spend 5 TCH on teaching (one third of the standard) the remaining 10 hours would be automatically charged to research. The departmental head has also priced him primarily for research and therefore will make a *completely independent arbitrary decision* as to salary distribution, regardless of EFT, TCH or the professor's declaration of effort - the latter being an important informational input! In this particular case we might have the following distribution:

	EFT	TCH/YEAR		% EFFORT	COST ATTRIBUTE	
	EFT	TCH	%		$	%
Teaching	.33	20	331/3	10	5,000	25
Research	.67	40	662/3	90	15,000	75
Total	1.00	60	100	100	20,000	100

The question of "pricing" is very complex; from the University's point of view, a market value exists for most classes and categories but one cannot eliminate the monopsonistic conditions in some cases. This point can be dramatized by the offer of a salary of $17,000 by Abraham Flexner to Albert Einstein in 1933 when university professor salaries ranged around $3,000. Eliminating, however, the exceptions to the rule, statistical background will help distribute dollar values to various functions. In the instructional field such information must be available to the departmental head for justification of decisions.

The model illustrated assumed the above reasoning of a distribution of EFT and dollar value. Further arbitrary decisions are made by the departmental head which probably differ from department to department. The figures in the model were developed by the application of such arbitrary methods and are tabulated in *Exhibit 2* as shown on page 13.

An important arbitrary costing decision might be the treatment of *General Research*. We consider *General Research* as the other side of the coin from teaching. For that reason we have fully absorbed -- as illustrated in Exhibit 2 -- *General Research* within instruction and have developed from that total *instructional unit cost*. This, however, might be completely unacceptable in a department where cost in connection with activities performed by designated research professors would inflate average course cost and thus the cost of teaching activities. If the latter has sufficient weight, the form shown as Exhibit 1 provides as a separate item *General Research Activities*. When developing program cost for a department in which *General Research Activities* could not be absorbed in instructional activities, such costs will be added arbitrarily by department heads to programs involved with strong research/dissemination interaction.

The setting of benchmarks and the money distribution were accomplished as indicated above. Certain indirect expenses were applied on the basis of the EFT relationships between the different categories. In individual departments another basis could be chosen. Traveling expenses and Equipment were directly applied, assuming actual spending. Here again only departmental heads can make these decisions based on facts, only they know much of this information.

By using methods as demonstrated in Exhibit 2, not only have we been able to translate "line items" into functions with dollar values, but were able to narrow such functions down to the basic functions of the University -- Instruction, Research, and Service, always remembering that price allocations are arbitrary and subjectively justified.

DISTRIBUTION OF LINE ITEMS
Exhibit 2

	(1) EFT	(1) $	(2) Dept-Admini. EFT	(2) $	(3) Instruction EFT	(3) $	(4) Counselling EFT	(4) $	(5) Gen. RSCH EFT	(5) $	(6) Spons. RSCH EFT	(6) $	(7) Service EFT	(7) $
1. Academic	20.5	310,000	1.0	25,000	15.0	222,254			.15	3,500	3.0	33,574	1.35	25,672
2. Counseling	.5	8,000					.5	8,000						
3. Clerical	4.0	22,000	4.0	22,000										
4. Salaries	25.0	340,000	5.0	47,000	15.0	222,254	.5	8,000	.15	3,500	3.0	33,574	1.35	25,672
5. Supplies		10,000		10,000										
6. Travel		30,000		30,000										
7. Equip.		10,000		10,000										
8. TOTAL	25.0	390,000	5.0	97,000	15.0	222,254	.5	8,000	.15	3,500	3.0	33,574	1.35	25,672
Distribution of Dept. Indirect Cost														
Basis														
9. Adm. Personnel - EFT%				(47,000)		35,250		1,175		353		7,050		3,172
10. Supplies - EFT %				(10,000)		7,500		250		75		1,500		675
11. Traveling - Direct				(30,000)		17,996		275		1,372		4,876		5,481
12. Equipment - Direct				(10,000)		7,000		300		800		1,300		600
				-0-		240,000		10,000		6,100		48,300		35,600
13. Transfer Counselling						10,000		(10,000)						
14. Transfer Gen. Rsch.						6,100				(6,100)				
				0	15.0	306,100		0		0	3.0	48,300	1.35	35,600

DEPARTMENT X

SUMMARY OF CLASSES FOR YEAR ___
(4 QUARTERS)

Course	SEC	STD	HRS	SCH	TCH	Cost/ TCH	$	$/SCH	Level	SEC	STD	SCH	TCH	Cost/ TCH	$
LL 101	13	360	5	1800	65	293.38	19,070	10.59	LL						
102	13	310	5	1595	65	293.38	19,070	11.96							
202	6	196	5	975	30	293.38	8,800	9.03		32	874	4370	160		46,940
UL 303	10	138	5	690	50	451.47	20,504	29.72	UL						
304	9	95	5	475	45	451.47	20,316	42.77							
502	3	100	5	500	15	451.47	6,772	13.54							
503	5	93	5	465	25	451.47	11,237	24.17							
504	3	60	5	300	15	451.47	6,772	22.57							
505	4	57	5	285	20	451.47	9,029	31.68							
506	4	41	5	205	20	451.47	9,029	44.04		38	584	2920	190		85,779
GR 601	4	45	5	225	20	632.98	12,656	56.75	GR						
602	3	25	5	125	15	632.98	9,491	75.93							
603	6	39	5	195	30	632.98	18,983	97.35							
604	4	38	5	190	20	632.98	12,656	66.61							
724	4	21	3	63	12	632.98	7,593	120.52							
725	4	35	3	105	12	632.98	7,593	72.31							
807	18	107	5	535	90	632.98	56,950	106.45							
915	6	61	5	305	30	632.98	18,983	62.24							
927	9	59	5	295	45	632.98	28,475	96.53		58	430	2038	274		173,381
	128	1888 / 15		9328			306,100			128	1888	9528	624		306,100

The next step is to apply the price tag to the activities performed as illustrated in Exhibit 3 – page 14. In our assumed department we taught 19 courses from level 100-900 in 128 sections and were involved in four research and three service projects. For purposes of simplification, our model assumed that only traditional lectures and seminars were conducted, disregarding laboratories and more complex instructional activities. In the Model, it was assumed that Instructors would teach 12 TCH per quarter while the remaining faculty would produce 10 TCH. We made no differentiation between teacher contact hours and teacher credit hours and concerned ourselves only with the first. Except for two courses for which we assumed a load of 3 hours per week all other courses had a load of 5 hours. To translate EFT into TCH we used the following tabular formula. From assuming the individual TCH per quarter we were able to reconcile our 15 instructional EFT in the model with those of the formula:

BENCHMARK							TCH	F	W	SP	S	TOTAL
3 EFT	@	12 Hrs.	x	4 Q	=		144	36	36	36	36	144
12 EFT	@	10 Hrs.	x	4 Q	=		480	140	130	120	90	480
15 EFT					=		624	176	166	156	126	624

Exhibit 3 summarizes the courses taught during the four quarters of the year and from that the individual instructor can be identified by rank and salary. Thus total academic line items were directly identified and translated into instructionally related cost:

	TOTAL ACADEMIC LINE ITEMS						INSTRUCTION				
	EFT	LOAD	TCH	$	$/EFT	$/TCH	EFT	TCH	$	$/EFT	$/TCH
INST	3.00	12	144	27,000	9,000	187.50	3.00	144	27,000	9,000	187.50
GRD	6.00	10	240	55,000	9,167	220.17	3.50	140	31,426	9,167	224.47
ASST	6.00	10	240	108,000	18,000	450.00	4.65	186	82,378	18,000	442.62
ASSO	3.00	10	120	60,000	20,000	500.00	2.50	100	50,000	20,000	500.00
PROF	1.50	10	60	35,000	23,333	583.33	1.35	54	31,500	23,333	583.33
Total	19.50		804	285,000	14,615	354.48	15.00	624	222,254		

Distribution of the teaching load to different levels of instruction and the application of indirect cost items were accomplished in the following two tables:

INSTRUCTION LOAD															
	LL			UL			GR/M			GR/D			TOTAL		
	EFT	LOAD	TCH	EFT	LOAD	TCH	EFT	LOAD	TCH	EFT	LOAD	TCH	EFT	LOAD	TCH
INST	3.00	12	144	–	–	–	–	–	–	–	–	–	3.00	12	144
GRD	–	–	–	2.50	10	100	1.00	10	40	–	–	–	3.50	10	140
ASST	0.40	10	16	2.25	10	90	1.00	10	40	1.00	10	40	4.65	10	186
ASSO	–	–	–	–	–	–	1.50	10	60	1.00	10	40	2.50	10	100
PROF	–	–	–	–	–	–	0.50	10	20	.85	10	34	1.35	10	54
	3.40		160	4.75		190	4.00		160	2.85		114	15.00		624

	LL		UL		GR		TOTAL		
	TCH	$	TCH	$	TCH	$	TCH	$	
INST	144	27,000	–	–	–	–	144	27,000	
GRD	–	–	100	22,447	40	8,979	140	31,426	
ASST	16	7,082	90	39,836	80	35,410	186	82,328	
ASSO.	–	–	–	–	100	50,000	100	50,000	
PROF.	–	–	–	–	54	31,500	54	31,500	
Total	160	34,082	190	62,283	274	125,889	624	222,254	83,846
Ind. Cost		12,858		23,496		47,492		83,846	– Ind. Cost = 222,254 =
		46,940		85,779		173,381		306,100	37.7253%
$/TCH		$ 293,375		$451,968		$ 632,777			

While level averages for teaching inputs ($ per TCH) are the simplest way of establishing level unit costs, it might be well for a department head to calculate average costs per student credit hour as illustrated in *Exhibit 3* to emphasize variances in SCH costs between courses.

As will be noted in *Exhibit 1*, "program contributions" are calculated on a cost per SCH basis. In this particular example the cost per student credit hour for the upper level (UL) program was $29.38/SCH. This figure was derived by dividing the total cost for the upper level program ($85,779) by the total SCH generated (2920). The cost per SCH was then distributed across the various major program in terms of student enrollments in the various classes. For example, 310 student credit hours (62 class enrollments), were generated by the department for those students enrolled in major 1. Therefore the program contribution to major 1 is 310 x $29.38 or $9,108.

The basic information for charging program contributions depends upon accurate student records of courses taken, both required and elected, and of the student's majors. The upper level and graduate program contributions are relatively easy to classify since all students at these levels have specified their majors. It is somewhat more difficult to classify the lower level students.

The lower level(LL) program contribution is in terms of the core program.[16] The typical core program is made up of four specific areas: Humanities (20 hrs), Science (20 hrs), Social Science (20 hrs) and major directed (30 hrs). For the purpose of determining program contribution to each of the areas, the following criteria will be used: Those core level courses taken by the student will be charged to the proper areas until the required number of hours (20) are earned. Any courses which would normally fall in the Humanities, Sciences, or Social Sciences area of core but will not because the student has already earned his 20 hours in that area, will be classified as major directed, to be later reclassified if necessary. These courses usually are core level courses required by a specific school or department above and beyond the general requirements.For example, John Smith has taken four 5 hour courses in the humanities core and takes a fifth course from the humanities core listing because his school requires it. This fifth course is charged to the major directed area of core.

In summary, the department head has in the Budget and Accounting Document a traditional line item budget with a functional distribution, an activity distribution based on costs per TCH and program contributions based upon student credit hours.

The Budget and Accounting document as here developed for departments and conceptualized as a model in *Exhibit 1*, can easily be recognized as a "Program-Budget". It can be extended to become a planning vehicle by adding multiyear budget information. When analytical justifications are added we have a viable planning vehicle. But there must be one realization: an organizational unit such as a department only contributes *to programs* and has no way of *managing programs!* It manages the activities of a department as efficiently as possible. Program decisions generally are handed down from upper levels and criteria for curricula are developed either by edict or by group *assent involving* the faculty within the department and school, as well as those in other departments. In this the "University" is fundamentally different from other organizations.

We *accentuated "generally"* when we stated "program decisions *generally* are handed down. . .."; in a university we have a particular and unique condition which will effect costing as well as decision-making. A department in most cases represents a "discipline" and is *responsible* for the output of a clearly described *degree or degree major*. It thus is responsible for a program area to which other schools may contribute in the same way that the Department contributes to their particular programs.

FOOTNOTES

1. Earl J. McGrath: Survival Kit for the Liberal Arts' Colleges, *(Chronicle of Higher Education)*, January 10, 1972.

2. Commission on Organization of the Executive Branch of the Government. A Report to the Congress 1955, Budget and Accounting Recommendation.

3. Wylie Kilpatrick, Classification and Measurement of Public Expenditures, The Annals of the American Academy of Political Science, 1936.

4. *Op. Cit.* pp. 20-21.

5. *Op. Cit.* pp. 21-22 (italics not in original).

6. Alfred D. Cavanaugh. A Preliminary Evaluation of Cost Studies in Higher Education (Office of Institutional Research, University of California, Berkeley, October, 1969).

7. John Dale Russell and James I. Doi, "Analysis of Institutional Expenditures", *College and University Business*, Vol. 19, No. 3, September, 1955.

8. James L. Miller, Jr., State Budgeting for Higher Education: The Use of Formulas and Cost Analysis, Michigan Governmental Studies, No. 45, Institute of Public Administration, the University of Michigan, 1965.

9. Charles T. Horngreen, *Cost Accounting: A Managerial Emphasis*. Prentice Hall Inc., Englewood Cliffs, N. J., 1967, p. 17.

10. Robert I. Dickey, *Accountant's Cost Handbook*. Ronald Pras Company, New York, 1960, pp. 11.

11. As defined by Cost Accountants.

12. It is realized that there are no profit-making institutions of Higher Learning in the United States which have University accreditation status.

13. Jesse Burkhead. Government Budgeting (New York, John Wiley & Sons Inc., 1962), p. 31.

14. Harry D. Kerrigan. Fund Accounting (McGraw-Hill Book Company, New York, 1969), p. 5.

15. "No where more than in the field of expenditure has classification been more circuitous in its reasoning, running into blind alleys, and nowhere has measurement been more rhetorical in its aims and unsubstantial in its results". (Kilpatrick, p. 1).

16. Richard D. Musgrove. The Theory of Public Finance (McGraw-Hill Book Company, New York, 1959), p. 5.

17. The University of Georgia Study, Volume 2, p. 253.

18. Georgia Board of Regents Core.